

REMARKS

This is intended as a full and complete response to the Office Action dated August 29, 2005, having a shortened statutory period for response extended one month, set to expire on December 29, 2005. Please reconsider the claims pending in the application for reasons discussed below.

Claims 19, 20, 22-25, 27, 35, 36, 38-40, 96-103 and 105-115 remain pending in the application. Claims 19, 23-25, 27, 35-36, 38-39, 40, 96, 98-99, 100-101, 103, and 105, are amended. Reconsideration of the claims is requested for reasons presented below.

A. Claim Rejections – 35 U.S.C. § 102

Claims 96-97, 99, 102, and 114-115 stand rejected under 35 U.S.C. § 102(b) as being anticipated by *Schiff* (U.S. Patent No. 2,439,491). In response, Applicants have amended claims 96 and 99 to more clearly recite aspects of the invention. The rejection is respectfully traversed. Independent claims 96 and 99, as amended, recite limitations not taught, shown or suggested by *Schiff*.

Schiff teaches an electroplating apparatus and a tank for holding the electrolyte and structure anodes and cathodes mounted in the tank. *Schiff* teaches an improved ventilating system for an electroplating apparatus whereby fumes or gases are prevented from escaping into the room in which the electroplating operation is conducted (see generally column 1, lines 26-30). The system disclosed by *Schiff* has a top wall 3, side walls 4, end walls 5 and a partition 6 beneath the top wall which has portions 7 above and converging downwardly toward the top of the electrolyte container (see column 2, lines 20-24). With this structure, any moisture that raise from the electrolyte will impinge upon the underside of the converging portions 7 of the partition 6, and if said partition is cooler than the moisture, the latter will condense on the partition and run downwardly toward the longitudinal center thereof and then drip into the container (see column 2, lines 25-34). The teachings of *Schiff* are limited to a structure for ventilation of the fumes and gases in order to prevent the gases from

escaping into the room. *Schiff* does not teach, show or suggest an electroless substrate processing apparatus. In addition, *Schiff* does not teach, show or suggest an evaporation shield adapted to be positioned over a substrate contacting a substrate support, the moveable evaporation shield comprising a degassing membrane in communication with a plenum in communication with a low partial pressure source.

Therefore, *Schiff* does not teach or suggest an electroless substrate processing apparatus, comprising a moveable evaporation shield adapted to be positioned over a substrate contacting a substrate support, the moveable evaporation shield comprising a degassing membrane in communication with a plenum in communication with a low partial pressure source, wherein the moveable evaporation shield forms an adjustable gap between the degassing membrane and the substrate as recited in claim 96.

Accordingly, Applicants submit claim 96 is allowable. In addition, claims 97, 102, and 115 depending from claim 96 are also allowable. Applicants respectfully request allowance of these claims.

In addition, as discussed above, *Schiff* does not teach or suggest an electroless substrate processing apparatus, comprising an evaporation shield adapted to be positioned over a substrate disposed on a substrate support, the evaporation shield comprising a degassing membrane and a plenum in communication with the degassing membrane, wherein a gap is formed between the degassing membrane and the substrate and a low partial pressure source coupled to the plenum as recited in claim 99.

Accordingly, Applicants submit claim 99 is allowable. In addition, claim 114, depending from claim 99 is also allowable. Applicants respectfully request allowance of these claims.

B. Claim Rejections – 35 U.S.C. § 103

Claims 19-20, 22-23, 25, 35-36, 103, and 105-107 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *JP 11279797A* to *Muraoka et al.* in view of WIPO Publication No. 00/75402 A1 to *Stockbower*. Claims 19-20, 22-23, 25, 35-36, 103, and

105-107 recite limitations not taught, shown or suggested by *Muraoka* and *Stockbower* alone or in combination.

Muraoka teaches a substrate plating device for plating a semiconductor wafer and a glass substrate used for a liquid crystal display device. In particular, *Muraoka* pertains to a technique in which power is supplied for electrolytic plating while an electrolytic solution of copper sulfate is supplied to the treatment surface of substrate (see paragraph 0001). *Muraoka* further discloses a plate-like member 15 made of a conductive material that is the same size as base material 3 that is provided above substrate retention mechanism 1. In addition, a push part 17 is configured with insulating upper part 17a and conductive lower part 17b and a lower inner side of lower part 17b is shaped to match that of the rim part of substrate. *Muraoka* discloses a distance d , between the lower surface of plate-like member 15 and treating surface W_s of substrate W supported by parts 5 to be small enough so that the treatment can be carried out with a reduced amount of electrolytic solution, and so that the concentration of the electrolytic solution can be maintained more easily (see generally paragraph 0040).

In *Muraoka*, a gap d between the treatment surface W_s and plate-like member 15 is formed and filled with electrolytic solution LQ. A controller part 55 then drives electric motors 9 and 13 at the same rpm and turns power supply unit 33 on in the meantime (see Figure 2(d)) to start the electrolytic deposition process. As a result, treatment surface W_s becomes the cathode, and plate-like member 15 becomes the anode, whereby electrolytic solution LQ filled in gap d is decomposed by the electric current, and copper is deposited on treatment surface W_s to plate it where electrolytic solution LQ is a copper sulfate plating solution. This structure enables the gaseous body that is generated by the electrolysis during the process to move upward naturally, so bubbles are not likely to remain in the trenches or on the treatment surface W_s . (see generally paragraph 54). As described above, *Muraoka's* teachings are directed to an electroplating mechanism where electrolysis is used for plating a semiconductor wafer in which power is supplied for electrolytic plating while a solution is supplied to the surface of substrate. *Muraoka* does not teach or suggest an electroless substrate

processing apparatus, comprising a liquid impermeable evaporation shield having a plenum coupled to a low partial pressure source and adapted to be positioned over a substrate positioned on a substrate support, the liquid impermeable evaporation shield having a liquid retaining surface that is fluidly coupled to the low partial pressure source through the plenum.

Stockbower discloses a method which provides two membranes situated in the plating fluid path between an anode and a substrate, which vents unwanted gases from plating solution before they reach the wafer (see Figure 1, items 14 and 15). *Stockbower's* design is aimed to prevent gas generated at an anode and entrained in a flowing electrolytic plating solution from reaching a substrate (see page 1, lines 14-25; page 2, lines 25-28 and 32-36). *Stockbower* does not teach or suggest or show an electroless processing apparatus comprising a liquid impermeable shield having a plenum coupled to a low partial pressure source and adapted to be positioned over a substrate positioned on a substrate support.

The combination of *Muraoka* and *Stockbower* does not teach, show or suggest an electroless substrate processing apparatus, comprising a liquid impermeable evaporation shield having a plenum coupled to a low partial pressure source and adapted to be positioned over a substrate positioned on a substrate support, the liquid impermeable evaporation shield having a liquid retaining surface that is fluidly coupled to the low partial pressure source through the plenum and adapted to form a gap with respect to the substrate, wherein the thickness of the gap is between about 0.5 millimeters and about 4 millimeters, as recited in claim 19.

Further, In order to establish a prima facie case of obviousness based on the prior art, the Examiner must show some objective teaching in the prior art that would lead that individual to combine the relevant teachings of the references. In re Fritch, 972 F.2d 1260, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992). *Stockbower's* design is aimed to prevent gas generated at an anode and entrained in a flowing electrolytic plating solution from reaching a substrate (see page 1, lines 14-25; page 2, lines 25-28 and 32-36). No one needing to remove gas generated at a substrate surface would ever look to the teachings of the remedial apparatus and method taught by *Stockbower*, with its two membranes positioned in the plating solution flow. Accordingly, there is no motivation

to combine the teachings of *Muraoka* with *Stockbower*. Therefore, Applicants submit that claim 19 and dependent claims 20, 22-23, 25, 35-36, 103, and 105-107 are patentable over *Muraoka* in view of *Stockbower*.

Claim 102 is rejected under 35 U.S.C. § 103(a) as being unpatentable over *Muraoka* in view of *Stockbower*. Claim 102 recites limitations not taught, shown or suggested by *Muraoka* and *Stockbower* alone or in combination.

Muraoka and *Stockbower* have been discussed above. The combination of *Muraoka* and *Stockbower* does not teach, show or suggest an electroless substrate processing apparatus, comprising a moveable evaporation shield adapted to be positioned over a substrate contacting a substrate support, the moveable evaporation shield comprising a degassing membrane in communication with a plenum in communication with a low partial pressure source, wherein the moveable evaporation shield forms an adjustable gap between the degassing membrane and the substrate as recited by claim 96 from which claim 102 depend. Therefore, Applicants submit that dependent claim 102 is patentable over *Muraoka* in view of *Stockbower*. Accordingly, Applicants respectfully request the rejection be withdrawn.

Claims 38-40 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Muraoka* in view of *Stockbower* and further, in view of *Cady* (U.S. Patent No. 4,544,446). Claims 38-40 recite limitations not taught, shown or suggested by *Muraoka*, *Stockbower*, and *Cady* alone or in combination. The teachings of *Muraoka* and *Stockbower* have been discussed above. *Cady* discloses a fluid flow guide spaced from the corresponding substrate in the form of a wafer for significantly reducing contamination in the processing of semiconductor wafers (see abstract). *Cady* does not cure the deficiencies of *Muraoka* and *Stockbower*. Therefore, the combination of *Muraoka*, *Stockbower*, and *Cady* does not teach or suggest an electroless substrate processing apparatus, comprising a liquid impermeable evaporation shield having a plenum coupled to a low partial pressure source and adapted to be positioned over a substrate positioned on a substrate support, the liquid impermeable evaporation shield having a liquid retaining surface that is fluidly coupled to the low partial pressure source

through the plenum and adapted to form a gap with respect to the substrate, wherein the thickness of the gap is between about 0.5 millimeters and about 4 millimeters as recited by claim 19, from which claims 38-40 depend. Therefore, Applicants submit that dependent claim 38-40 are patentable over *Muraoka* in view of *Stockbower*, and in further view of *Cady*.

Claims 98 and 113 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Schiff* in view of *Stockbower*. Claims 98 and 113 recite limitations not taught, shown or suggested by *Schiff* and *Stockbower* alone or in combination. The teachings of *Schiff* and *Stockbower* have been discussed above. As discussed above, *Schiff* does not teach, show or suggest an electroless substrate processing apparatus comprising a degassing membrane. Furthermore, *Stockbower* does not teach, show or suggest an evaporation shield adapted to be positioned over a substrate disposed on a substrate support. Therefore, the combination of *Schiff* and *Stockbower* does not teach, show or suggest an electroless substrate processing apparatus, comprising an evaporation shield adapted to be positioned over a substrate disposed on a substrate support, the evaporation shield comprising a degassing membrane and a plenum in communication with the degassing membrane, wherein a gap is formed between the degassing membrane and the substrate, and a vacuum source coupled to the plenum as recited in claim 98. Therefore, Applicants submit that claim 98 and dependent claim 113 are patentable over *Schiff* in view of *Stockbower*. Accordingly, Applicants respectfully request the rejection be withdrawn.

Claim 100 is rejected under 35 U.S.C. § 103(a) as being unpatentable over *Muraoka* in view of *Stockbower* and further, in view of *Ikeno et al* (U.S. Patent No. 4,821,675). Claim 100 recites limitations not taught, shown or suggested by *Muraoka*, *Stockbower*, and *Ikeno* alone or in combination. The teachings of *Muraoka* and *Stockbower* have been discussed above. *Ikeno* discloses a color filter dyeing apparatus for dyeing a color filter formed on a substrate. The color filter comprises a chuck for holding the substrate on which the color filter is mounted, a dyeing solution receptacle in

intimate engagement, by means of a sealing member, with the chuck or the substrate, and forming a container for containing the color filter therein and an inlet for supplying the dyeing solution into the container (see abstract). *Ikeno* does not cure the deficiencies of *Muraoka* and *Stockbower*. Therefore, the combination of *Muraoka*, *stockbower*, and *Cady* does not teach or suggest an electroless substrate processing apparatus, comprising a liquid impermeable evaporation shield having a plenum coupled to a low partial pressure source and adapted to be positioned over a substrate positioned on a substrate support, the liquid impermeable evaporation shield having a liquid retaining surface that is fluidly coupled to the low partial pressure source through the plenum and adapted to form a gap with respect to the substrate, wherein the thickness of the gap is between about 0.5 millimeters and about 4 millimeters as recited by claim 19, from which claim 100 depends. Therefore, Applicants submit that dependent claim 100 is patentable over *Muraoka* in view of *Stockbower*, and in further view of *Ikeno*. Accordingly, Applicants respectfully request the rejection be withdrawn.

Claim 108 is rejected under 35 U.S.C. § 103(a) as being unpatentable over *Schiff* in view of *Mathieu* (U.S. Patent No. 6,042,712). Claim 108 recites limitations not taught, shown or suggested by *Schiff* and *Mathieu* alone or in combination. *Schiff* has been discussed above. *Mathieu* discloses a plating system which includes a tank for containing a plating solution, a substrate holder, and a temperature control device. The substrate holder is configured to support a substrate in position so that at least a first face of the substrate is exposed to the plating solution in the tank (see abstract). *Mathieu*, as in *Schiff*, does not teach, show, or suggest the use of any of its components in conjunction with an electroless plating solution or to perform an electroless plating process. Also, the combination of *Schiff* and *Mathieu* do not teach, show or suggest an electroless substrate processing apparatus, comprising a moveable evaporation shield adapted to be positioned over a substrate contacting a substrate support, the evaporation shield comprising a degassing membrane in communication with a plenum in communication with a low partial pressure source, wherein the evaporation shield forms an adjustable gap between the degassing membrane and the

substrate as recited by claim 96, from which claim 108 depends. Accordingly, Applicants submit claim 108 is allowable and respectfully request allowance of this claim.

Claim 110 is rejected under 35 U.S.C. § 103(a) as being unpatentable over *Schiffli* in view of *Mathieu*. Claim 110 recites limitations not taught, shown or suggested by *Schiffli* and *Mathieu* alone or in combination. As discussed above, *Mathieu* and *Schiffli*, do not teach, show, or suggest the use of any of their components in conjunction with an electroless plating solution or to perform an electroless plating process. Also, the combination of *Schiffli* and *Mathieu* do not teach, show or suggest an electroless substrate processing apparatus, comprising an evaporation shield adapted to be positioned over a substrate disposed on a substrate support, the evaporation shield comprising a degassing membrane and a plenum in communication with the degassing membrane, wherein a gap is formed between the degassing membrane and the substrate, and a low partial pressure source coupled to the plenum as recited by claim 99, from which claim 110 depends. Accordingly, Applicants submit claim 110 is allowable and respectfully request allowance of this claim.

Claim 109 is rejected under 35 U.S.C. § 103(a) as being unpatentable over *Schiffli* in view of *Stockbower* and in further view of *Mathieu*. Claim 109 recites limitations not taught, shown or suggested by *Schiffli*, *Stockbower*, and *Mathieu* alone or in combination. *Schiffli*, *Stockbower* and *Mathieu* have been discussed above. *Mathieu* does not cure the deficiencies of *Schiffli* and *Stockbower*. Therefore, the combination of *Schiffli*, *Stockbower* and *Mathieu* does not teach, show or suggest an electroless substrate processing apparatus, comprising an evaporation shield adapted to be positioned over a substrate disposed on a substrate support, the evaporation shield comprising a degassing membrane and a plenum in communication with the degassing membrane, wherein a gap is formed between the degassing membrane and the substrate, and a vacuum source coupled to the plenum as recited by claim 98, from which claim 109 depends. Accordingly, Applicants submit claim 109 is allowable and respectfully request allowance of this claim.

Claim 111 is rejected under 35 U.S.C. § 103(a) as being unpatentable over *Schiff* in view of *Danielson* (U.S. Patent No. 5,112,465). Claim 111 recites limitations not taught, shown or suggested by *Shiff* and *Danielson* alone or in combination. *Schiff* has been discussed above. *Danielson* discloses a contamination control apparatus for sealable interconnection with plating tanks of the character used in the electrodeposition of an electrodeposit onto a substrate which is uniquely designed so as to efficiently capture any metal atoms released from the plating solution and to return them to the solution by force of gravity (see abstract). The combination of *Schiff* and *Danielson* does not teach, show or suggest an electroless substrate processing apparatus, comprising a moveable evaporation shield adapted to be positioned over a substrate contacting a substrate support, the moveable evaporation shield comprising a degassing membrane in communication with a plenum in communication with a low partial pressure source, wherein the moveable evaporation shield forms an adjustable gap between the degassing membrane and the substrate as recited by claim 96, from which claim 111 depends. Accordingly, Applicants submit claim 111 is allowable and respectfully request allowance of this claim.

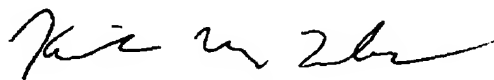
Claim 112 is rejected under 35 U.S.C. § 103(a) as being unpatentable over *Schiff* in view of *Stockbower*. Claim 112 recites limitations not taught, shown or suggested by *Shiff* and *Stockbower* alone or in combination. *Schiff* and *Stockbower* have been discussed above. The combination of *Schiff* and *Danielson* does not teach, show or suggest an electroless substrate processing apparatus, comprising: a moveable evaporation shield adapted to be positioned over a substrate contacting a substrate support, the moveable evaporation shield comprising a degassing membrane in communication with a plenum in communication with a low partial pressure source, wherein the moveable evaporation shield forms an adjustable gap between the degassing membrane and the substrate, as recited by claim 96, from which claim 112 depends. Accordingly, Applicants submit claim 112 is allowable and respectfully request allowance of this claim.

PATENT
Atty. Dkt. No. APPM/005840.03/PPC/ECP/RKK**NEW CLAIMS**

Applicants have added new claims 116-125 to claim additional aspects of the invention. Applicants believe that no new matter has been entered. Applicants respectfully request allowance of new claims 116-125.

Having addressed all issues set out in the office action, Applicants respectfully submit that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,



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